

Phylosophical ESSAY,

Treating Of
The most Probable Cause of that
Grand Mystery of Nature,

THE
Flux & Reflux:

OR,
Flowing and Ebbing of the
SEA.

L O N D O N.

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Physiological
Essays

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Collection of
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British Museum

The British Museum
The British Museum
The British Museum
The British Museum



To the Learned and Judicious,
Sir **JOHN MARSHAM,**

O F
*Wboornes - Place in Kent, Knight
and Baronet, one of the Six
Clerks of His Majesties High
Court of Chancery.*

SIR,



*Hen the Sun opens the
Curtains of the East,
and Guilds and En-
amels the Fringes of
the Firmament, with
his early Beams, the lesser Lights re-
signe themselves up to his, and Muffle
them-*

The Epistle Dedicatory.

themselves up in their own Obscurity
as being vanquish'd with an excess of
Splendor; so the meaner and pettier
Censures shall look faint and dim, if
You, that are the great Luminary in
the Orb of Learning, shall shed a pro-
pitious Beam and Influence upon
this Crude Essay, which will not only
rescue it from the Virulency of De-
traction, but so foment and improve
it, that it will Bourgeyn and Flourish
under your Protection; So that though
it owe its Birth to my Pen, it
will Entitle its Verdure and Per-
fection to your Candid Acceptance
of it; Now it is offer'd up to Yours,
from the hands of him, who is,

SIR,

Your most Affectionate
Servant,

Thomas Philipot.



A Brief

DISCOURSE

OF THE

Most Probable Cause of that Grand

Mystery of Nature,

The Flux & Reflux of the SEA.

Here is a huge Variety of Opinions, that Entitle themselves to have un-
 wound the cause of this Grand Mis-
 tery of Nature, *The Flux and Re-
 flux of the Sea*, But they are erec-
 ted upon untenable Principles, and so entwin'd
 and Complicated, that I may say of them, as
Florus did of the Mountainous Inhabitants of
 the *Alpes*, *Pluris erat Invenire quam Vincere*, It
 is a greater Difficulty to trace out, and unrav-
 ell them, than to Subvert, or Dismantle
 them.

The First Opinion, Is,

OF *Leonardus Lessius*, who affirms, That the Motion of Reciprocation or Replication, commonly styl'd, *The Flux and Reflux of the Sea*, Entitles its Primitive and Original Causality, to the Supernaturall Guidance and Managery of an Angel; But if the strength of Man be seen in his Reason, and the strength of Reason evidenced in his Judgment; and the strength of Judgment manifested in his Knowledge, all these Three by this frail Opinion must be destroyed; for, who will ever Attempt by a noble winning and Industrious Pursuit and Inquest after the more eminent, but Cloudy and Abstruse Causes of Nature, to unlock the Mysteries of them, which are laid up in her Gloomy Cabinet, when he can affirm, that their Operation owes its Original Emanation, or Efflux, to the Supernatural Conduct of an Angel, and this at last will become the Common Sanctuary to Shelter a Universal Ignorance: Indeed, I do not Deny, but the Hand of Gods speciall Providence is sometimes stretched out and extended to support Nature when she is feeble and faint in her Operations, or else to Knit and Twist Extraordinary Causes with Extraordinary Effects, when she is not able to perfect and perform this union, and then only when she is Defective either in her Strength or in her Light; But to do it always, and Assert that these Extraor-

traordinary Efforts of Gods, Special Providences are visibly manifested at all Times, and in all seasons, is to Ravel and Discompose the Chain of Second Causes, whose Operations are still Interwoven with the Concourse and Concomitance of the First. But the Irregularity of this Opinion will further appear by this Question, Why have not the *Baltick, Euxine, and Caspian* Seas this Flux and Reflux of waters, by this Angelical Motion; since they are as Capable of it, as other parts of the Ocean abroad, that daily Receive it? Besides, it is Absurd to imagine that Seas divided by such vast Intervals, should at one and the same Instant swell into Tides, and fall into Ebbings, by the Transport and Managery of one single Angel, and yet these waters being equally mov'd, should produce such different Fluxes and Refluxes. And now I hope by this time Wise Men will laugh at this Opinion, not in Applause, but Contempt, of the Vanity of it.

The Second Opinion, Is,
That of our Country man *Lidius*, who avers, that the *Rise and Reflux of the Sea*, owes its Primitive Efficiency to Subterraneous Fires, Fed and Fomented by a stock either of Sulphurous or else of Bituminous Matter. But this Position of his meets with so many Ruinous and Destructive Difficulties, that it is almost impossible to Reconcile it to Truth, for it is by

all Agreed, That the Flux and Reflux of the Sea, is Periodical in its Revolution, and so determined, fix'd and certain: But if this Opinion of his should be Assented to, where there is not this Collection of Sulphurous and Bituminous Matter (as on the Coast of Norway, and other places) there would be no Tydes at all. Besides, where this Stock of Combustible Matter is wholly wasted and em-pair'd, The Flux and Reflux of the Sea, must wholly cease: But then 2dly. Why should not the Dead-Sea in Palestine, or the Lake As-Phaltites, that has such an eminent congestion of Bitumen transfus'd through the Bowels of it, be Capable of Prodigious Tides? but this we know is Contradicted by all Experience. 3dly. Why should not the Bahick Sea that is replenish'd with many Bituminous particles (as appears from the Generation of Amber, which most do Conclude to be a Coagulum or Concretion of Salt, Sulphur and Bitumen, and which is frequently found upon the Coast of Liefeland, Carland, and Prussia) have these Tides and Ebbings which every one knows to be contrary to all Observation? 4thly. Why do not the Tides upon the Coasts of Sicily and Naples, Swell to a very Important Height, since both their Circumambient Shores, are bound with such a Copious Quantity of Sulphur? But this we know is evidently false, the Sea not Swelling upon those Coasts to a Diameter of above three or four Foot when it is

at the Highest. But last of all, if you ask *Ed-
dies*, what Superior cause Produces these Sub-
terraneous Fires, he will tell you, that is the
Reflexion of the Beams of the Sun upon the
Convex Superficies of the Sea: To this I An-
swer, That by the Consent of many eminent
Philosophers, the Rays of the Sun never ope-
rate by penetration upon that watery Body
above Fifteen Cubits, and so Impossible, where
the Sea is of any considerable Depth, to pro-
duce these Subterraneous Fires. And thus, I
think, I have Sufficiently disarm'd his Opi-
nion.

The Third Opinion Is,

THAT *The Flux and Reflux of the Sea*, is caus'd
by some prodigious Eddies and Whirle-
pools, that suck and transport the Sea from
the North to the South, and from the South
to the North; That there is such a vast whirl-
pool upon the coast of *Norway*, is most certain,
which is by Mariners Stiled, *The Navel of the
Sea*: But, that there is such an one in the
Southern Hemisphere to refund back the Sea
by a motion of replication, no Observations
either of *Kamusius*, *Linschoten*, or the more curi-
ous *Dr. Leir* have ever discovered to us, whose
Searches and Inquisitions into the Mysteries of
the *East-Indian* and *West-Indian* Seas, were
never yet cavil'd or quarrel'd at: Besides, if
there were any such in those parts, upon the

reciprocal return of the Southern waters towards the North, that multitude of angry Circles, which discompose, by reason of that Voluminous Whirlpoole, the face of the *Norwegian* Sea, would every 24 hours disband, and be smooth, as the aspect of peace, and even as the margent of a Poole, when it is not disordered into wrinkles by the rough breath of a ruder Tempest. But this is Contradictory to the daily Observation of the Inhabitants that confined upon the Fringes of this stupendous Whirlpoole.

Thus, I think likewise, this opinion, that is Supported by such feeble Crutches, is at last overturned.

The Fourth Opinion.

BUt as some have found out a Navel, so *Kepler* hath found out the Lungs of the Sea: for he asseveres the Terrestrial Globe to be but one great Animal, and that the *Flux and Reflux of the Sea* does proceed from the *Sistole* and *Diastole*, or the Contraction and Expansion of dits Spacious Lungs: But then I ask, First, Whether does this Motion Result, either from Air, or some Spirit? or Secondly, Does it Issue either from a Sensitive or Rational Soul? And Thirdly, I enquire upon what Coast these prodigious Lungs are Situated? And until the Abettors of this wild Opinion (if there be any such) do give some Satisfactory Answers to these

these Queries, this Opinion is Demolished by a bare Negation of it.

The Fifth Opinion, Is,

OF *Picus Mirandula*, that this Increase and Decrease of waters, is caused *per Mutuas & Benevolas Aquarum Allicientias*, that is, by a motion of Aggregation or Sympathetical Connexion, by which water does vigorously endeavour to unite and Convince with water. But if this were granted, Streams would seek to entwine with Streams and Lakes twist with Lakes, till at last, long before, this the world must have Suffered under the angry Baptisme of a publique Deluge. Secondly, where there is this Motion of Aggregation or Connexion, the Tides would swell to an Important Height, as in the *Caspian*, *Euxine* and *Baltick* Seas, where all Geographers that have display'd to us the Topography of those places, have discover'd to us that a multitude of huge Rivers do daily dis-embogue themselves: And on the other side, those Seas that do not swell with the Additional Supplies of very few or no Rivers, as the *Normegian* Ocean, and others, would have very little or no Tides at all, Both which are evidently false, and repugnant to daily Observation: Therefore this Opinion of His, establish'd upon such fraile principles, does easily shrink and languish into its own Ruine.

The

The Sixth Opinion

DOes aver, that the Sea does entitle the Causality of its *Flux and Reflux* to some Currents that either set from East to West, or from North to South: But if this were assented to, the *Red-Sea*, the *Euxin-Sea* and the *Baltick-Sea*, would improve themselves to a huge Increase of Tides, considering all three are fed by a Communication of perpetual Currents: but this is manifestly false, for the *Red-Sea* and *Euxine* have little or no Tides; and the *Baltick-Sea* none at all; Therefore I wave this Opinion as altogether Erroneous.

The Seventh Opinion

ENtities the Motion of the Earth, to be the Cause of the Motion of the Sea; Those who aber this Opinion, affirm Three things.

First, That the Earth and Sea have but one Center to render the whole Globe more regularly and Uniformly Orbicular, and so more apt for that Motion they are designed to receive.

Secondly, They assert, that every part and particle of this Spherical body is so tyed and threaded together by a magneticall union, that it is Impossible that the least Atome should start out of its natural situation, being fastened and fettered to its station by so inexpugnable a Magnetism.

Thirdly

Thirdly, that its motion is circular; now the *Flux and Reflux of the Sea*, is *motus Transversus*, or a motion of reciprocation and rejection, like water that is jostled and thrown from side to side in a Paile or Bowl: now, if it should move circularly, every part would move so evenly & Magnetically, that there would be no *Flux or Reflux of the Sea* at all. Secondly, since the *Buxine*, *Baltick* and *Caspian* Seas are such Considerable parts of this Globous body, they must move equally with it if it move at all; and then why have they not the same *Flux and Reflux* as other Seas have, since they have the same Aptitude, or natural intrinsic Capacity, to receive this Motion as other Seas have? But that they have not *Flux or Reflux* at all is Demonstratively true. But whether this Opinion be so or no I refer to the Scrutiny of the Judicious Reader: Indeed, I could wish that those who defend the Motion of the Earth, would produce more vigorous Arguments to fortify and secure their Thesis, meerly to Subvert the Popes Infallibility; one of whom, not many years since, by a Signal Determination and Definition *ex Cathedra*, blasted it for Impious, and Heretical, and Condemned the obstinate Assertors of it, to his truest Purgatory, the Inquisition.

The Eighth Opinion, Is,

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Sun is a partiall, Concurrent or Concomitant cause, I Affirme, But that it is the sole and principal, I deny, and that upon these Foundations, for, if it should be, the tides in the vast Wilderness of the Northern Seas, would upon the *Apogæum*, or Recess of the Sun, shrink and Contract themselves, for want of his Vigorous Excitation to a Considerable Decrease, and again, upon his *Pærigæum*, or nearest Approach, swell to an Important Magnitude, Both which are evidently false, for it is Generally observ'd, that about the *Autumnall Equinox*, and sometimes after, the Tides in those Seas abovesaid, are Improv'd and Increase, to an Extraordinary Height, & on the Contrary, about the *Summer Solstice*, they suffer a sensible and visible Diminution and Decrease, rather than any Augmentation: both which were absurd to Imagine, if the Sun was the Sole Efficient cause.

Secondly, why should not the *Caspian, Euxine, & Baltick* Seas, be Capable of this Motion, since they are also expos'd to the Impressions of the Sun either perpendicular, or by Vibration, when he is in or near his *Pærigæum*; But this they have not, is Evident, and therefore the Sun is not the Prime, Sole and Efficient cause of the *Flux and Reflux of the Sea*.

The Nineth Opinion, Is,

THat the Moon is the principal cause of this Marine Motion, that it is a Subservient, Concurrent

current and Consequence cause I shall Grant, but
 that it is the sole Efficient I shall at ver affirm, for if it
 were it would Universally and equally move all
 Seas, especially when they are under its Perigee, and
 then the *Baltick, Buxian and Caspian* Seas would
 be Capable of this *Flux & Reflux* likewise, But that
 they are not is apparently Evident. I know it is ob-
 jected that the *Moon* hath a principal efficiency in
 the Flowings of the Sea, because it is observ'd, that
 when she is in her Sextile & in her full, Shell-fish do
 swell and Increase to an unusual Bulk and Corpu-
 lency: But to this I answer, that this is produced not
 by any direct Causality of the *Moon*, but only by ac-
 cident, for those great Tides, which flow & ebb at those
 Times transport with them a huge Quantity of
 Mud & Salts, which treasure up a far greater victi-
 mous juice which shell-fish greedily sucking in, by the
 supply of so lusticious an Alimony, enlarge their
 bodies to that Dimension they arrive at at those sea-
 sons.

The Tenth Opinion.

V Next I allude to is, that there is a Violent,
 Volatile or Armoniacal Salt or Spirit, that
 is wrapt up in the Bowels of the Sea and lies there
 clapt up and imprisoned in the Embraces of the
 fixed and frozen Salt, which spirit is Exhaled by
 the agitation of the Tides of the Sea, and the
 opening of it by the heat of the Sun, and the
 pressure of the Sun and Moon, and the heat of the
 latitude, and thus it is said to be the cause of the
 and

and drags along with it, that Heap of waters we stile the *Flux*, (though I do not Deny but that it is something aided and assisted in this Operation by an Elater or Spring of Air, that being rescued from its Compression and confinement, ascends up with it,) and upon closing and Contracting its Face upon the Recess of those two great Luminaries, shrinks back again, and with it pulls along that mass of waters it before had eleuated, and this produces the *Reflux*. And this Opinion is Supported by three Experiments: The First is that of *Zuingerus* a modern Chymist, cited by *Framondus* in his Book of Meteors, who observ'd that some sort of Chymicall oile of vitriol did ascend and descend in Times proportionate and adequate to the *Flux and Reflux of the Sea*. The Second is that of *Athanasius Kircherus* in his *Mundus Subterraneus*, who there discovers to us, that an Infusion of *Saharmatick* lodg'd in an open Vessel and plac'd obliquely to receive the Influence of the Moon, when she was in her Sextile, did Increase and Decrease as if it held an equal Correspondence, by an uninterrupted Chain of Atoms, with the Flowings and Ebbings of the Marine waters. The Third is that of *Groenvelt's* Glasses, upon whose sides if you beat with Impetuous onsets, they resist their Impression, but break it at the Top, and it flies in pieces with much violence and tumult. And the Reason is, because the *Mercurius* or volatile Salts that by impulsion are raised up on the sharp pines, and Circumflexion of the Nigrous or fixed Salt, finding a self enfranchis'd and redeem'd from the strict Enclosures of those two rigid Adversaries, Saltes,

gallies out, with an impetuous Eagerness, and that Eruption occasions that disorder and confusion now

But I know it will be objected, why have not the *Euxine, Balthick and Caspian Seas* their *Blue and Red flux* likewise, since it is probable their waters imbu'd with as great a stock of vitriolated, volatile, or *Armoniack* Salt as other Seas are entrusted with, that have the same Vicissitudes; To this I Answer that it is as probable they have not; But suppose they had, yet its volatile Spirit is checked & depressed by that multitude of vast and deep Rivers, that perpetually discharge themselves into those Seas above said; And it is likewise possible, that there is a Considerable Quantity of *Sulphur, Bitumen*, fixed & Nitrous Salt, conducted along with there Currents, whose fixing Quality may improve the Depression of the Vitriolated and *Armoniack* particles, and so benum their Volatility that it is almost impossible for the united Influences of the Sun & Moon, to excite their so stupified Vigour. But if it be enquir'd how it happens, since so many capacious streams disembogue themselves into those Seas, that the neighbouring Territories, doe not suffer under a constant Inundation? I answer, that the water that is treasur'd up in the Cells and Caverns of the Earth, which it is probable here are more than ordinary copious, entice and allure back the marine waters, *Per Motum Nexus* by a Motion of Adherence, Aggregation, union and Connexion, and so by a continual Circulation, reimburse, and new Stock the Rivers, with Additional streams which are daily paid in so profuse a Tribute, to the vast Exchequer of their watry Sovereign.

